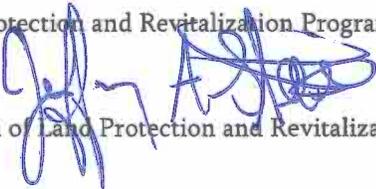


COMMONWEALTH OF VIRGINIA
Department of Environmental Quality

Subject: Division of Land Protection and Revitalization Guidance Memo
LPR-SW-SI-25
SUBMISSION INSTRUCTIONS FOR GROUNDWATER
MNA-BASED CORRECTIVE ACTION SITE EVALUATION (CASE) REPORTS AT SOLID
WASTE LANDFILLS

To: Regional Land Protection and Revitalization Program Managers

From: Jeffery A. Steers 
Director, Division of Land Protection and Revitalization

Date: July 13, 2012

Copies: Regional Directors

Summary

This guidance provides owner/operators of regulated solid waste management facilities with an overview of the information applicable to the submission of Corrective Action Site Evaluation (CASE) reports at solid waste sites undergoing *Monitored Natural Attenuation* (MNA) based groundwater remediation in accordance with 9 VAC 20-81-260 of the Virginia Solid Waste Management Regulations (VSWMR). CASE reports form the basis for quantifying a remedy's ability to meet the remedial goals, and if applicable, the triggering of the need for an Alternate Remedy to be applied to address the groundwater plume.

Electronic Copy

An electronic copy of this guidance applicable to solid waste sites is available on DEQ's website at <http://www.deq.virginia.gov/waste/guidance.html>.

Contact Information

Please contact the groundwater program coordinator, Mr. Geoff Christe at (804) 698-4283 or via email geoff.christe@deq.virginia.gov with any questions regarding the development or application of this guidance. Owner/operators who have questions specific to their remedy's performance on site should contact their respective Regional Office for groundwater assistance.

Disclaimer

This document is provided as guidance and, as such, sets forth standard operating procedures for the agency. However, it does not mandate any particular method nor does it prohibit any alternative method. If alternative proposals are made, such proposals should be reviewed and accepted or denied based on their technical adequacy and compliance with appropriate laws and regulations.



Submission Instruction

Groundwater
MNA-based
Corrective Action
Site Evaluation
Reports at Solid
Waste Landfills

Division of Land Protection &
Revitalization
629 East Main Street 5th Floor
Richmond, VA 23219

I - APPLICABILITY

This Submission Instruction (SI) is applicable to all solid waste management facilities conducting groundwater monitoring under the requirements of the Virginia Solid Waste Management Regulations (VSWMR), originally promulgated by the Virginia Waste Management Board December 21st, 1988; as amended and has been designed in a manner consistent with the regulatory language in Amendment 7 of the VSWMR, effective March 16th, 2011.

II - DEVELOPMENT

This SI has been developed to assist an owner/operator in the preparation of Corrective Action Site Evaluation (CASE) reports which document the relative performance (or rate) of groundwater cleanup since implementation of an MNA-based groundwater remedy. This SI references or refers to technical information contained in several EPA documents. The reader is referred to the following for information specific to MNA use as a groundwater cleanup method:

- EPA OSWER Directive 9200.4-17p; Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites. April 1999
- Performance Monitoring of MNA Remedies for VOCs in Groundwater, EPA/600/R04/027, April 2004

These SI provide an outline of the suggested minimum technical content that should be included within CASE reports submitted to the Department for review. It is ultimately the responsibility of the owner/operator to include all the data or information necessary to sufficiently support each of the conclusions presented in the CASE. The Department recognizes that these SI may need to be altered to fit facility-specific geologic or hydrologic conditions that cannot be adequately accounted for in a SI. It is expected that the final content of any CASE submitted to the Department will include some site-specific content.

All SI are considered 'living' documents which will be updated or revised as needed. Comments or suggestions for future SI revisions can be submitted at any time to the attention of the Solid Waste *Groundwater Program Coordinator* at the address listed on the cover of this SI.

III - LIMITATIONS

These SI have not been developed as Department rule or policy. They have not gone through public comment. They do not supersede any regulatory requirement found in the VSWMR and their use is not mandated under the VSWMR. These SI may contain references to EPA's commentary in its preamble to the Subtitle D regulations and its 1993 Subtitle D regulation guidance. EPA's preamble contains its expanded interpretation of the technical content in the 40

CFR 258 statute and addresses the response to public comment received during the draft regulation process. Although EPA's preamble language is referenced within the SI, preamble language is not a binding part of a law/statute and it can neither enlarge the scope of a statute's applicability nor confer powers to the regulatory authority not already expressly contained within the language of the statute. At the same time, if there is a question of the intent or meaning behind any portion of the Subtitle D statute text and the preamble addresses the question, the content of the preamble cannot be ignored if it addresses the ambiguity raised. The Subtitle D regulatory guidance developed by EPA expands further upon the content of the preamble, but has the same limitations in that guidance cannot be used to infer requirements that are not expressly part of the Subtitle D statute.

Groundwater protection standards (GPS) are the cornerstone of the solid waste remedial program but are not the only remedial endpoints an owner/operator may have to meet. EPA continues to use drinking water standards [i.e., maximum contaminate level (MCL)] as the cleanup baseline in its RCRA corrective action programs (outlined in its 2004 Corrective Action guidance; pg. 5.4 as follows):

"For groundwater that is currently used or designated as a current or reasonably expected source of drinking water, EPA recommends that regulators identify cleanup levels based on residential drinking water exposure scenario. Even if no one is currently drinking the groundwater, the cleanup level should generally be based on drinking water use if the aquifer is considered by EPA or the state to be reasonably expected future source of drinking water."

IV - SUBMISSION TIMELINES

Facilities implementing an MNA-based remedy must evaluate the groundwater quality trends post remedy implementation consistent with the timeframes defined in Permit Module XIV. Most commonly, the CASE submissions will be due on a 3, 4, or 5 year interval based largely on the annual groundwater flow rate on site and proximity to environmental receptors or property boundaries. Once set in the Permit, the CASE submission interval can only be changed via the Permit modification process. Any revisions to the submitted CASE needed to address Department technical review comments shall be submitted in a manner consistent with the time-frames defined in the Department's review letter.

V - REPORT FORMAT

The requirement to submit a CASE report is found within 9 VAC 20-81-260.G.1 and pertains all to sites which have exceeded their GPS and have started groundwater remediation. CASE reports are technical summaries that require conclusions supported by site-specific data obtained during the evaluation period. To reduce the volume (total pages) of the CASE report, the Department suggests that analytical data reports, QA/QC data, and field logs be included in the

document on a CDROM. To further minimize the content of the submission, there is no need to include a detailed description of a site's operational history, geology or hydrology as this information is included each year in the Annual Report required under 9 VAC 20-81-250.E. Inclusion of a simplified summary of these topics is all that is required in the CASE.

Any owner/operator choosing to implement an MNA based remedy must be fully cognizant that the results of the CASE period monitoring must prove biologic destruction of the contaminant mass. As noted by EPA in its 2004 MNA guidance:

“Several processes may control the fate of the dissolved plume (e.g., the processes that are the components of the attenuation rate: dispersion, dilution, sorption processes, volatilization, and chemical and biological degradation) ... only chemical and biological degradation actually destroy contaminant mass ...”.

Such proof of destruction of contaminant mass should be based on data collected from properly located MNA monitoring wells (as noted by EPA guidance below):

“ ... contaminant trends at monitoring points located throughout the plume will be needed to adequately interpret progress toward most contaminant reduction goals”.

“A reduction in contaminant concentrations between two monitoring points that are not in the same flow path may not accurately represent contaminant attenuation in either flow path. A monitoring system designed for evaluating the performance of an MNA remedy with respect to specific remedial action objectives may be very different from the network established during earlier phases of site characterization, ...”.

For the sake of consistency and to ensure an expeditious review, the information (technical content) of the CASE report should be arranged in the order presented in sections below. The sections discussed herein shall be considered standard technical content. Report submissions that do not provide the standard technical content outlined herein are more likely to be found to be incomplete and requiring revision during the Department's technical review process. The Department also notes that there may be some site-specific instances where a facility's technical data may require additional or different information beyond that listed in these SI as a means of more fully characterizing the technical data available and conclusions derived thereof. These instructions set no limit on the number or content of additional report sections, as long as the information included directly pertains to that required of a CASE report.

VI - TECHNICAL CONTENT

Form-1 to this SI consists of a blank, boilerplate formatted MNA-based CASE report to be filled out by the owner/operator. Electronic versions may be obtained from your DEQ Regional Office groundwater contact. It is the sole responsibility of the owner/operator to include the information required to prove the remedy applied on site is working toward achieving all GPS in the manner anticipated in the Corrective Action Plan. Nothing prevents the Department from reaching a conclusion of submittal deficiency if the submission fails to adequately prove a site specific remedy is performing as anticipated, even though the submission may include all the baseline requirements defined in the VSWMR what apply to all sites, regardless of the remedy implemented.

The standardized information items to be address for MNA sites are discussed individually below. Many items are formatted in a 'Yes' or 'No' manner. Yet the Department is fully aware that such answers will often have to be back-up up by detailed additional information. Therefore, this SI allows a more detailed discussion of the relevant issue to be presented in the associated Appendix. In this way, the 'fill in the blanks' design of the CASE report serves as an executive summary for quick review of the results of the CASE period, while still allowing the owner/operator the chance to further describe complicated issues in appropriate detail relevant to technical review/comment. This type of report design increases the readability for the lay person while still including the level of detail expected when discussing complicated issues which often affect remediation progress on a site.

Each of the CASE topic questions that require further explanation is individually discussed below. If a line number is not listed, it is a question topic the Department felt needed no further explanation within this SI.

FORM 1 LINE INSTRUCTIONS

General Information:

- Line 1 List DEQ Regional Office to which you submit your groundwater reports. You may abbreviate as NRO (Northern), PRO (Piedmont), VRO (Valley), TRO (Tidewater), BRRO/R (Blue Ridge - Roanoke), BRRO/L (Blue Ridge - Lynchburg) and SWRO (Southwest).
- Line 5 Identify the landfill type, (i.e., Unlined sanitary [uS], [uCDD], or industrial [uIND] or Lined sanitary [lnS], [lnCDD], or industrial [lnIND]).
- Line 6 Note the date the CAP related Permit amendment/modification was issued. If remedy implementation took place under a mechanism other than amendment/modification, list the date of the Department's approval letter.
- Line 7 List the date the CASE was due to the Department based on Permit Module XIV.

- Line 8 List the period covered by the CASE period (i.e., March 2009 – March 2012).
- Line 9 Acknowledge whether or not a copy of the CASE was forwarded to the public data repository as listed in the facility Permit, Module XIV.

Section A - Remedy/Plume Behavior

- Line 13 Based on current groundwater quality data, list the currently anticipated CAP completion date. If the completion date has been pushed back significantly, then the separate issue of corrective action financial assurance may need to be addressed.
- Line 17 Under solid waste corrective action, wells are judged to have achieved GPS if they have had no GPS exceedances for three consecutive years of sampling. If any of the site wells have met that requirement during the CASE period, list those wells here.
- Lines 20/21 Plumes on site may be large and complex. The intent of the question is to allow the owner/operator to list a 'yes' if groundwater quality has improved in some (but maybe not all) of the performance and/or sentinel wells onsite. It is acknowledged that it is unlikely groundwater improvements will be seen on a uniform basis on site due to hydrologic constraints and proximity to the waste mass.
- Line 22 Evidence of plume expansion includes any increasing trends in groundwater constituents in plume margin wells, or the recognition of detects in sentinel wells formerly devoid of any detected landfill constituents. Additional information including the calculated groundwater flow rate and plume migration direction can be included in the Appendices.
- Line 26 Protection of HH&E refers to whether or not the remedy was successful in preventing direct exposure to the impacted media.
- Line 27 Most commonly this will refer to the construction of final impermeable cover. Unless the entire source area is covered by final impermeable cover, the use of 'yes' should not take place. In those cases where the source includes both impermeable capped and pre-88 capped waste areas, the answer should be listed as 'no' and further explanation can be provided in the Appendices.
- Line 31 Under EPA-defined MNA, MNA performance monitoring should include a Performance well located hydrologically downgradient / on same GW flow path from each GPS exceeding compliance well. This is the only viable way to compare parent / daughter ratios within the same slug of groundwater as it moves away from its source area (which is represented by the Compliance well sampling point).
- Line 33 Plumes which discharge to surface water at concentrations above GPS should be undergoing remediation to cease the discharge. Please note that under EPA's Subtitle D defined groundwater monitoring and corrective action programs, surface water quality standards were not a substitute for determining when groundwater remediation should be occurring. If sampling results in surface water exceed a GPS, continued use of MNA may no longer be applicable in the associated portion of the plume.

Section B – Groundwater Sampling

- Line 41 Copies of the VELAP certificates should be included in the CASE Attachment VII.
- Line 42 An important line of MNA evidence is the documented increase in daughter compounds vs. parent compounds in groundwater further away from the source area. Parent daughter ratios should be used to quantify the rate of VOC mass breakdown over time.
- Line 43 One of the most important lines of MNA evidence is the documented change in electron donors vs. acceptors in groundwater further away from the source area as this records the biologic activity responsible for destruction of the waste mass.

Section C – Risk Exposure Factors

- Line 48 Approval for use of MNA will have been based on an acceptable review of potential risk topics. If land use changes take place on adjacent properties since the remedy has been implemented, then the baseline risk review results may no longer be applicable or supportive of continued MNA use.
- Line 49 Refer to Line 27 notes.
- Line 51 This issue must be addressed if there are any structures on site or off site which sit above the groundwater plume.
- Line 53 Use of the answer 'no' will only be appropriate for those landfills which are located in urban areas surrounded on all sides by properties currently hooked to a municipal-supplied water source and there is a local mechanism, restriction, or ordinance which prohibits any well installation (including wells for non-potable use).
- Line 55 Refer to Line 33 notes. EPA MNA guidance notes application may be restricted if unacceptable cross-media transfer of landfill contaminants is found to be taking place.

Section D – Interpretation of Analytical Results

- Line 57 Trend analysis requires a minimum of 10 independent data points be available. This will likely require use of older data from previous CASE periods. Any trend analysis done as part of a CASE submission should include all data acquired since remedy implementation.
- Line 59 Time Series data plots, showing trend analysis/regression line, should be included for all GPS exceeding constituents, in each well they are recognized at GPS exceeding values. For certain VOCs, the owner/operator may choose to superimpose the trends of parent/daughter pairs to visually define the changes in one versus the other over time. Otherwise, the plots should be constructed for single constituents.

Section E – Future Actions

- Line 65 Use of 'yes' should only occur if the trend analysis supports groundwater quality

improvement at rates which would achieve GPS within a reasonable timeframe. The Department will allow some leeway during the initial CASE period to allow sufficient data to be collected from newly installed MNA wells. However, once 10 independent data points are collected, the performance of MNA, and its ability to achieve GPS should be quantifiable.

- Line 66 If there is doubt that MNA alone can meet site-wide GPS, the VSWMR allow an owner/operator the option of implementing an additional remedy component via the Interim Measures allowance (which typically does not entail Permit modification). If the answer to this question is 'yes', further detail should be presented in the Appendices.
- Line 67 If there is doubt that MNA and Interim Measures can meet all GPS, the VSWMR require an Alternate Remedy be applied. If the answer to this question is 'yes', further detail should be presented in the Appendices.
- Line 69 If there is doubt that MNA, Interim Measures, and Alternate Remedy can meet GPS, the VSWMR allow the owner/operator the option to submit a technical infeasibility demonstration showing that GPS cannot be practically met on site regardless of the remedy implemented. If the answer to this question is 'yes', further detail should be presented in the Appendices.

REQUIRED CASE REPORT ATTACHMENTS

- I Include applicable portion of a USGS, 1:24,000-scale, topographic map with site location clearly identified.
- II Provide a property boundary map delineating the landfill property and the boundaries of all adjacent properties which share a boundary with the landfill or are separated from the landfill by a road, railway, or surface water. The information should be sourced from county or municipal property records, tax maps, etc.
- III Provide an aerial photograph covering the landfill and surrounding properties clearly displaying current land user. The date, scale and source of the imagery should be included on the photography.
- IV Include groundwater flow rate calculations based on the most recent CASE period sampling event.
- V Provide a potentiometric surface map, scaled to fit a folded page no larger than 11" x 17" based on the most recent groundwater data obtained during the CASE period.
- VI Provide a table which lists each compliance and corrective action monitoring well on site and shows each of the groundwater constituents found to exceed GPS since remedy implementation. Any constituents found to exceed for the initial time should be presented in italics.
- VII Provide vertical and horizontal plume maps individually for each groundwater constituent exceeding its GPS at any time during the CASE period. The maps may

be scaled to fit a folded page no larger than 11" x 17". In addition, the owner/operator must include one total VOC iso-concentration map based on the most recent groundwater data obtained during the CASE period.

- VIII Included copies of all laboratory reports issued during the CASE period, including the cover and signature pages, as well as the VLAP accreditation certification form. This information is preferred submitted on CDROM.
- IX Attach a copy of the 'chain of custody' and field-book sheets for each sampling event during the CASE period. This information may be presented on a CDROM.
- X Provide copies of any computer generated statistical analysis. This information may be presented on CDROM if desired, however, it is preferred that any time series plots included, be presented in hard copy form.

REPORT APPENDICES (to be used as necessary)

- A Detailed Information on Remedy/Plume Behavior
- B Detailed Information on Groundwater Sampling Actions
- C Detailed Information on Risk Exposure Factors
- D Detailed Information on Analytical Result Interpretation
- E Detailed Information on Future Actions

FORM 1 (see following pages)

MNA-based Corrective Action Site Evaluation (CASE) Report Summary	
	1) DEQ Region: _____
	2) Date: _____
3) Solid Waste Permit Number: _____	
4) Facility Name: _____	5) Landfill Type: _____
6) Date of Groundwater Remedy Implementation (Permit Amendment Issuance): _____	
7) Case Report Due Date: _____	8) CASE Report Period: _____
9) Was Public Repository copied on CASE submittal: _____	
10) Name and location (City/Town) of Public Repository: _____	11) Which groundwater CASE report submittal (circle one) is this? 1 st 2 nd 3 rd 4 th 5 th 6 th 7 th Other _____
Section A - Remedy/Plume behavior: Please use 'Y', 'N', 'NA' – not applicable, or 'P' – possibly, where needed. Any response of Y or P should be fully explained in the associated Appendix.	
12) List the anticipated MNA completion date presented in the original CAP Submission?	_____
13) Based on CASE period data, what is the current anticipated MNA completion date?	_____
14) Were there any performance problems or Operations and Maintenance issues associated with MNA components during CASE period?	_____
15) (if yes to 14) Were these problems rectified during CASE period?	_____
16) Were GPS achieved in <u>all</u> portions of the plume during CASE period?	_____
17) (if no to 16) List any MNA wells that did achieve GPS during CASE period:	_____
18) How many compliance wells continue to exceed GPS during CASE Period?	_____
19) Did any formerly 'clean' Compliance wells exceed GPS during this CASE period?	_____
20) Compared to previous data, did GW quality improve in at least some of the Performance wells during CASE Period?	_____
21) Compared to previous data, did the GW quality improve in at least some of the Sentinel wells during CASE Period?	_____
22) Was there any evidence of lateral or vertical plume expansion during CASE Period?	_____
23) (if yes to 22) Were any new wells installed to address expansion during CASE Period?	_____
24) Are any MNA wells screened below the base of the GPS exceeding areas of the plume?	_____
25) Are there clean sentinel wells (i.e., no GPS exceedance) located at the edge of the plume?	_____
26) Was remedy protective of human health and environment during entire CASE Period?	_____
27) Was there a remedy component in place to control source of release during CASE Period?	_____
28) Did any MNA wells exceed MCL-based GPS during the CASE Period?	_____
29) Did any MNA wells exceed BKG-based GPS during the CASE Period?	_____
30) Did any MNA wells exceed ACL-based GPS during the CASE Period?	_____
31) Are there Performance wells located downgradient from each exceeding Compliance well?	_____
32) Was surface water sampling part of the MNA remedy?	_____
33) Did surface water sampling results show concentrations in excess of GPS in surface water?	_____

Section B - Groundwater Sampling: Please use 'Y', 'N', 'NA' – not applicable, or 'P' – possibly, where needed. Any response of Y or P should be fully explained in the associated Appendix.	
34] Were all Permit-listed MNA network wells (list below) sampled during CASE period?	
35] If not, list the wells which could not be sampled:	
36] List the reason for the non-sampling during CASE period:	
37] Other than issues noted above, were all Corrective Action related wells sampled at the required quarterly or semi-annual frequency outlined in Module XIV during CASE period?	
38] (if no to 37) List the reason for the non-frequency sampling.	
39] Were all MNA related wells sampled for constituents of Module XIV during CASE period?	
40] (if no to 39) List the reason for the non-sampling of Permit required constituents:	
41] Were all analysis during CASE period conducted by VELAP certified facilities?	
42] Did analytical results support biologic destruction of the waste mass during the CASE period based on changes in downgradient parent/daughter ratios?	
43] Did results of MNA performance parameter sampling support biologic destruction of waste mass based on changes in electron receptor/donors within the plume of contamination?	
44] Are copies of all sampling event analytical results obtained during the CASE Period attached as an Appendix to this report in CDROM format?	
Section C - Risk Exposure Factors: Please use 'Y', 'N', 'NA' – not applicable, or 'P' – possibly, where needed. Any response of Y or P should be fully explained in the associated Appendix.	
45] Does owner/operator legally own/control all areas currently underlain by landfill contaminated groundwater (i.e., those portions of the plume that exceed GPS)?	
46] (if no to #45) Provide the name of current ownership:	
47] Was there any potential for exposure of humans or environmental receptors to contaminated groundwater during the CASE Period?	
48] Was there any change in adjacent property land-use during the CASE Period which could change the potential exposure risks previously defined during remedy selection?	
49] Are source area containment components in place to prevent exposure and minimize future releases?	
50] Was there any remedy related site activity which created a short term exposure risk to workers or the environment during the CASE period?	
51] Is there any potential for vapor intrusion issues above the landfill contaminant plume?	
52] Is groundwater currently used (or potentially used) on site for any reason?	
53] Is groundwater currently or potentially used as a potable water source in the landfill area?	
54] (if needed) Is there an alternate drinking water supply in the vicinity of the landfill?	
55] Is there evidence (or potential for) plume discharge (levels above LOQ) to surface water?	
Section D - Interpretation of Analytical Results: Please use 'Y', 'N', 'NA' – not applicable, or 'P' – possibly, where needed. Any response of Y or P should be fully explained in the associated Appendix.	
56] What statistical method was used to assess groundwater trends during CASE Period:	
57] Was prior CASE period data pooled with current CASE data to develop the time series plots?	
58] Were any unusual statistical problems noted (i.e. outliers)?	
59] Were time series plots provided individually for all GPS exceeding constituents in each MW they were identified in during the CASE period?	

60] When looking solely at Sentinel well data during the CASE period, did any constituents show upward trending concentration behavior in any well (if so, list constituent(s) on the line below)?	
61] When looking solely at Performance well data during the CASE period, did any constituents show upward trending concentration behavior in any well (if so, list constituent(s) on the line below)?	
62] When looking solely at Compliance well data during the CASE period, did any constituents show upward trending concentration behavior (if so, list constituent(s) on the line below)?	
63] Do the down-plume changes in stoichiometric Parent/Daughter ratios confirm breakdown of contaminant mass?	
64] Do the results of EPA MNA performance parameter sampling (i.e., redox potential, DO, manganese (II), iron (II), sulfate, methane, etc.) and electron donors vs acceptors document biological breakdown of contaminant mass?	
Section E – Future Actions: Please use 'Y', 'N', 'NA' – not applicable, or 'P' – possibly, where needed. Any response of Y or P should be fully explained in the associated Appendix.	
65] Based on the data acquired during this CASE period, and reviewed in context of data collected during previous CASE periods, does the implemented remedy have the ability to achieve all GPS within a reasonable timeframe.	
66] (if no to 65) Is Interim Measure use justifiable on site?	
67] (if no to 65 and 66) Is Alternate Remedy application justified on site (if yes list remedy type on line below)?	
68] Is the Alternate Remedy discussed in detail in the current CAP?	
69] (if no to 65 - 67) Will owner/operator be submitting a technically infeasible demonstration (as defined in the VSWMR) to the Director?	
70] Are there any other actions planned for the site during the upcoming CASE period not currently covered by the existing CAP?	
Attachments. The following attachments must be included in the CASE in the order prescribed.	
Attachment I: Site Identified on a USGS 7 1/2-minute Topographic Map	
Attachment II: Property Map(s)	
Attachment III: Aerial Photograph(s)	
Attachment IV: GW flow rate calculations (based on most recent CASE period sampling event)	
Attachment V: Potentiometric Surface Map, scaled to fit a size no larger than 11" x 17", based on the most recent CASE period sampling event	
Attachment VI: Table of constituents exceeding GPS, listed for each well, based on all available sampling data obtained post remedy implementation	
Attachment VII: Vertical and Horizontal Plume maps provided for each GPS exceeding constituent on site (wherever possible – sized to fit on an 11" x 17" sheet)	

Attachment VIII: Statistical Analysis and Time Series Data Plots for each GPS exceeding constituent identified within individual wells sampled during the CASE period	
Attachment IX: Complete Laboratory Analytical Reports (including Verification events) for each sampling event during the CASE period	
Attachment X: Chain of Custody and Field Book documentation (including Verification events) for each sampling event during the CASE period	
<i>Note: Attachments IX and XI may be submitted in electronic format on CD.</i>	
Appendices. The following should be included as needed following the instructions in the SI. If an Appendix is not going to be used, insert its title page followed by the word "reserved".	
Appendix A - Remedy/Plume behavior, Detailed Discussion	
Appendix B - Groundwater Sampling, Detailed Discussion	
Appendix C - Risk Exposure Factors	
Appendix D - Interpretation of Analytical Results, Detailed Discussion	
Appendix E - Future Actions	
Responsible Official Signature	
<p>I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.</p>	
Name:	Title:
Signature:	Date: